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COVER PHOTO: *Group photo of the North American Pollinator Conservation Workshop in Oaxaca, Mexico.*

SEE ENTRY ON PAGE 3. *Photo courtesy of CEC Staff*

The IPD Newsletter is a biannual publication produced by the International Programs Division of the Natural Resources Conservation Service (NRCS).

The document provides a six-month overview of NRCS participation in international activities, which included providing technical assistance and exchanging scientific and technical information.

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Activities

Cambodia & Vietnam

Tanse Herrmann, District Conservationist from Sturgis, SD, traveled to the Kingdom of Cambodia and the Socialist Republic of Vietnam from February 14-29 as an international experience participant with the South Dakota Agricultural and Rural Leadership (SDRL). The program exposes South Dakotan agricultural services and banking representatives, producers, and government officials to agriculture production methods, commodities, culture, and public/private leaders in foreign countries. This provides participants with an opportunity to bring ideas and lessons home for sharing and implementation once home. Tanse used this opportunity to share his expertise on natural resources, soil, and soil health with his 27 classmates.

Visiting Hi-Tech Centre in Vietnam Photo courtesy of SDARL

In Vietnam, they visited the Agricultural Management Centre for Research and Development, where innovative production methods are tested and shared with the public and investors in the Centre. Products grown there include orchids, mushrooms, and several varieties of vegetables, utilizing high tunnel structures and subsurface irrigation methods to maximize efficiencies related to natural resource consumption. Other learning opportunities included a visit to a worm farm where unprocessed water buffalo dung is collected off-site, aged with sun and water, then placed in long shaded bed structures where native earthworms process the manure – ultimately leading to a compost material that is bagged and sold to area farmers as a soil amendment. The participants also learned about the critical importance of the Mekong River for irrigation and shipping.

In Cambodia, the group learned about the shared importance of rice production in this country and Vietnam. Cambodian products include sugar from the sugar palm tree, rubber tree plantations, cashew nut, and black peppercorn production.

Program blog available online at http://sdarl.blogspot.com/

Participant at Kubota dealership in Cambodia. Photo courtesy of SDARL

Cameroon

Charles Kome, Soil Scientist with

the Soil and Plant Science Division (SPSD) of the Soils Information branch in Greensboro, NC, traveled to the Republic of Cameroon January 18 –25 to represent NRCS at the CocoaSoils Conference. This conference was intended to build a common understanding around the CocoaSoils program and engage partners to further strengthen cocoa research that will assist resource poor cacao farmers around the world in developing sustainable soil health management programs to improve cacao quality and yield per unit area.

The main objective of the conference was to develop ways to improve yields per unit area on existing farms to meet production goals, rather than establishing new cocoa farms through deforestation. The agenda addressed challenges facing smallholder cocoa farmers globally as they improve cocoa yields, while maintaining or improving soil health on current lands without further deforestation. The group also addressed the issues of child labor, ways to earn a living wage from farming cocoa and gender issues in the operations of cocoa farms.

Cacao trees require specific ranges of soil types, temperature and moisture regimes that limit their geographic distribution. The optimum range of cocoa is within the 20° North and 20° South latitude of the equator in humid tropical conditions encompassing a land area of over 70 million hectares. Typical farm sizes range from 2-3 hectares on a wide variety of soil orders with marginal yields. Globally, cocoa is grown by approximately five million farmers. These farmers lack resources and an understanding of desirable soil types or soil management.

Years of mismanagement has led to poor soil health contributing to declines in cocoa productivity in West Africa. Farmers simply do not have access to information to help them understand how to best apply inputs, control soil erosion, and protect against high prevailing temperatures which has led to a loss of soil organic matter.

Declining yields of cocoa plantations in West Africa means lower income for farmers. To compensate for low yields and improve their livelihoods, farmers see converting more forests into cocoa farms as their best choice, resulting in massive deforestation. Among other factors, soil degradation and poor soil fertility have emerged as critical factors contributing to the decline in productivity in cocoa. There exists a knowledge gap on good crop nutrition and proper management of cocoa trees. In particular, there is a lack of understanding regarding the necessary nutrition for the cocoa tree, such as nitrogen, phosphorus, potassium, and other nutrients.

Breakout session led by Dr. Richard Asare as a pool of cocoa scientists drawn from across the globe discuss

With rising global demand for cocoa, sporadic price spikes due to declining yields or other unpredictable forces, there is growing interest in improving the quality and quantity of cocoa in order to satisfy the market. Growing cocoa consumption, particularly in Asia, has increased the demand for the ingredient by $100 billion, one million tons, or roughly a quarter of world's current production by the end of 2020.

The U.S. is the number one consumer of cocoa in the world. It is critical for American industries to have access to reliable and consistent supply of high-quality and affordable cocoa for confectionary businesses to satisfy consumer demands. While cacao is native to South America, 70% of the world's cocoa is produced by Cote d'Ivoire, Ghana, Nigeria and Cameroon. Therefore, it is vital for the chocolate industry to safeguard the production potential of West African countries.

As the leading U.S. agency in improving soil health, NRCS has amassed vast knowledge and expertise in the development of guidelines for soil health and quality assessment and monitoring for a variety of crop management scenarios in diverse ecosystems. NRCS SPSD has a track record of providing technical assistance on soil health assessment and monitoring by deploying and utilizing soil quality test kits in developing countries who lack soil laboratory services. NRCS' understanding of the factors favoring and limiting cocoa production in Africa can contribute towards improving production in South America to meet cocoa bean demand of U.S. industries.

Mexico

Christine Taliga, National Ecologist from the Ecological Sciences Division in Washington DC traveled to the United Mexican States February 3-7 to attend the Commission for Environmental Cooperation North American Pollinator Conservation Workshop. As part of the North American Agreement on Environmental Cooperation (NAAEC) to strengthen regional pollinator conservation to secure local benefits across Canada, Mexico, and the United States of America. The purpose of the workshop was to develop a tri-national North American Pollinator

Conservation Framework vision, along with future actions for collaboration among Mexico, Canada, and the United States.

The workshop was attended by approximately 11 Canadian, 15 Mexican, and 13 U.S. delegates. It was facilitated by Northern Arizona University through interactive small group sessions enumerating key pollinator knowledge gaps, drivers of change, and tri-national collaborative opportunities. Regionally, habitats most impacted by current drivers of change included grasslands, semi-natural habitats such as farmland edges, wetlands, and forests. Brainstorming sessions to develop successful strategies to address pollinator declines related to land use drivers identified topics including: grassroots farmer driven peer certification programs, farm conservation planning, financial and technical assistance, and farmer led initiatives. To advance the conservation framework, priority components were identified, information sharing and science coordination, mapping and monitoring coordination, tri-national identification of shared high-risk and high-value ecosystems and species, and annual progress reporting related to shared priorities. Highlights of the workshop included a presentation by local honey bee farmers and mezcal producers. For next steps, the workshop facilitators will follow up with development of the draft framework including the following sections: 1. North American Pollinators state of knowledge; 2. Summary of drivers of change impacting pollinators; 3. Specific pollinators of importance by country (Mexico, Canada, and the U.S.); 4. Pollinators in local communities; and 5. Key pollinator conservation initiatives.

The U.S. delegates attending this workshop included representatives from: U.S. Forest Service, U.S. Geological Survey (USGS), University Researchers (Northern Arizona University, Penn State), Pollinator Partnership, Monarch Joint Venture, Association of Fish and Wildlife Agencies, and Xerces Society.

Facilitated small group break-out sessions were utilized in the development of the draft tri-national pollinator framework. Photo courtesy of CEC staff

Through participation at this workshop, NRCS was able to foster sustainable ecosystems; strengthen private lands pollinator conservation; provide information about USDA Farm Bill programs benefiting pollinators, agricultural operations and wildlife habitat; strengthen existing partnerships with U.S. Fish and Wildlife Service, USGS, Penn State University and Northern Arizona University, private non-profit partners such as Monarch Joint Venture, Pollinator Partnerships, and Xerces Society. Participation at this workshop may lead to future collaborative opportunities to conserve pollinator habitats on private land.

International Visitors

New Zealand

Shaun McKinney, Acting Director, Ecological Site Descriptions, participated in the USDA meeting with Terry Copeland, CEO of Federated Farmers of New Zealand on Friday, January 17. The theme of the meeting was a discussion around the similarities and differences in the agricultural and food systems of the United States and New Zealand. Shaun presented on gaining farmer buy-in on environmental protections. Discussions included Farm Bureau Mechanisms, Farm Crop Insurance System, World Wine Trade, Farm Bill, New Zealand Environmental Regulations, and Water Management.

Turkmenistan

Katrina Thompson, National Program Manager, Conservation Reserve Program, Beverly Preston, Conservation Reserve Program Manager, Farm Services Agency and Kari Cohen, Projects Branch Chief of the Financial Assistance Program Division met with five environmental experts from Turkmenistan on Tuesday, January 28. Katrina provided an overview of the Conservation Reserve Program including its history, authorities, administration, and programs. Kari gave a presentation on the Regional Conservation Partnership Program which included history, the components of a conservation plan, and the program's steps and practices.

Embassy Science Fellowship (ESF)

The U.S. Department of State (DOS) fellowship program provides missions with an opportunity to leverage the expertise of U.S. government scientists to build relationships and partnerships that advance American foreign policy and scientific priorities to further our understanding of worldwide science trends, promote U.S. scientific norms, and advance American foreign policy interests. The ESF enables overseas posts to acquire scientific advisory capacity on issues important to

their missions. This competitive program where applicants apply for specific proposals was developed by the U.S. embassy and is matched by DOS. Since 2002, NRCS has sponsored 23 Fellows to work in areas of strategic importance to NRCS.

Marshall Islands

Brian Baskerville, Geographer/GIS Specialist, from Lincoln, NE, was selected as an ESF by the DOS for 2019 to implement his research in the Republic of the Marshall Islands (RMI). His fellowship was designed to consist of a total of 46 days and included two separate field visits to the country. The objective was to work with the Environmental Protection Authority (EPA) to implement better Geographic Information Systems (GIS) tools, methods, and techniques to help address coastal erosion and illegal solid waste dumping, as well as assisting in water quantity and quality monitoring.

His initial trip took place February 3-27, where he was assigned to the U.S. Embassy in Majuro, RMI. Brian provided training on the use of Trimble's Terraflex to provide a mobile platform that the EPA field teams could use in the field as well as access from the cloud environment back in the office. Initially the EPA used four licenses provided by the NRCS office in Nebraska. After reviewing the platform and agreeing on its benefits, the EPA purchased four Terraflex licenses of their own from Frontier Precision in Honolulu, HI. As of this writing, the new licenses have not yet been activated due to complications resulting from COVID-19.

Monitoring bore holes with the Water Quality team. Photo courtesy of Brian Baskerville.

Brian also developed a procedure for the EPA field teams to better capture much of their work via their cell phones by uploading forms, pictures, and GPS locations to a central cloud database accessible in the office. He then developed Excel-based forms for the teams to automatically import the collected data into forms. Through improved record keeping, these improved conservation practices will result in better decision making through data.

Brian was originally scheduled to return to RMI in March to fulfill the second component of his Fellowship, but this has been delayed due to the COVID-19 travel restrictions. He hopes to return to train the RMI team once the Terraflex licenses are activated. For the time being, he continues to aid the EPA on technical issues in a limited manner via email.

Palau

Nels Liljedahl, District Conservationist from Conway, NH, was selected as an ESF by the DOS for 2019 to implement his research in the Republic of Palau for 90 days in March to May 2020.

Nels' main objective was to assist The Ebiil Society in implementing their reforestation efforts and provide technical assistance to improve their processes. The Ebiil Society is a non-profit organization dedicated to promoting the proper management of natural resources through traditional cultural practices. They focus largely on education and grassroots community involvement to accomplish their conservation objectives. The group integrates indigenous cultural practices with modern science to solve ecological problems.

Chipper requested by Nels and procured by U.S. Forest Service to make mulch for tree-planting. Photo courtesy of Nels Liljedahl

Reforestation is important in Palau in order to reduce erosion of exposed lands, which contributes to sedimentation in streams that drain into the ocean and causes harm to the ecosystems of mangrove forest, seagrass beds, and coral reefs. Many of the exposed lands are abandoned bauxite mines from the Japanese occupation between 1917 and 1945. Located on steep slopes, these former mines have never been revegetated due to the lack of organic matter in the soil and high aluminum toxicity. The savanna areas suffer from wildfires, leading to exposed soil and erosion. Due to the problems associated with wildfires, fire monitoring, prevention, and education are integral to mitigating this process.

Nels observed the reforestation process and assisted with harvesting seeds, seedlings and

cuttings from the surrounding native forest. He advised on improving nursery operation, site selection for plantings and the tree planting events. He helped to incorporate mulching into The Ebiil Society's existing deforestation program. As a result, large quantities of mulch were procured for five tree planting events. These events planted six acres on abandoned mines and another five acres on burnt land. Staff and volunteers from many parts of the country, including high level government officials, foreign Ambassadors, and Traditional Chiefs were involved. On Earth Day the group set a record in Palau with the participation of 120 volunteers to plant trees at one site.

Nels took on added responsibilities by teaching school groups about the natural environment of Palau, monitoring sea turtle nesting, monitoring manta rays, helping with fire suppression strategies, and assisting with invasive plant and animal eradication efforts, all on a 28-acre island managed by The Ebiil Society. Furthermore, he assisted The Ebiil Society in procuring additional grants from the U.S. Forest Service, to fund future projects to further their mission. Additionally, he wrote a proposal on behalf of The Ebiil Society and the Ngardok Lake Conservation Area, for future Embassy Science Fellows to assist them with their conservation goals.

As a result of travel restrictions due to COVID-19, Nels was not able to return as scheduled in May. While he was stranded, he took on a short-term detail as the Acting NRCS Resource Conservationist, Pacific Islands Area to address environmental issues in Palau until he departed for New Hampshire on July 24.